



Mushrooms

Marketing

1 Markets

EU trade of fresh mushrooms totaled 146 thousand MTs (US\$384 million) in 1996, with 27 thousand MTs (US\$118 million) supplied by non-EU suppliers. Germany, Italy, Austria, and France accounted for 98 percent of total imports from non-EU sources. EU trade in dried mushrooms was under 7 thousand MTs (US\$85 million) in 1996, with just under 4 thousand MTs (US\$60 million) supplied by non-EU suppliers. Germany, France, and Italy imported 90 percent of total EU imports from non-EU sources. Overall market demand for mushrooms is even greater as domestic production, particularly for fresh product, is also strong.

Table 1: EU Mushroom Trade, 1996

	Fresh	Dried*
Volume (MTs)		
Extra-EU	27,390	3,934
Intra-EU**	118,437	2,703
Total	145,827	6,637
Value (ECU 000s)		
Extra-EU	107,582	54,317
Intra-EU**	241,722	22,730
Total	349,304	77,047

* includes truffles; ** includes reexports of extra-EU trade;

ECU 1.00 equals approximately US\$1.10

Source: EUROSTAT

While the overall market for fresh and dried mushrooms in the EU is large, it is also somewhat misleading when looking at potential opportunities for Uganda. Because of distance to market and lack of a cold chain, the fresh market will be difficult to penetrate. It is a quality market, well supplied by domestic producers and by exporters in nearby Eastern Europe. Furthermore, the oyster mushroom, produced in Uganda, is only a very small fraction of total demand in both the fresh and dried markets. Sales of white (button) mushrooms are the vast majority of the market, and there are other specialty mushrooms (chanterelle, Portobelo, and shiitake) that have much more demand than oyster. Dried product is reportedly oversupplied with the result that prices have been dropping.

2 Customers

Eighty percent of mushrooms are sold directly to the supermarkets at pre-arranged prices. According to the UK Mushroom Growers Association, British consumers prefer fresh mushrooms which explains the small demand for canned and dried product. One growth area is the catering trade, with prepared salads and mixes, and it was

suggested by the Mushroom Growers Association that most dried product will go towards this sector. However, caterers surveyed in March 1998 report already having ample supply. Dried oyster mushroom exports from Uganda are being purchased by a small specialty foods company in the UK and distributed through small health food stores. Demand is very limited and there is little opportunity for increased sales.

3

Volumes

While EU demand for fresh and, to a lesser extent, dried mushrooms is strong, this is not the case for oyster mushrooms. Oyster mushrooms are a niche product. One wholesaler reports that he sells around ten boxes of oyster mushroom in the same time as thousand of boxes of button mushrooms. In fact, not all mushroom wholesalers carry the product; often it is sold directly to caterers. Some industry sources in the UK recommend that Uganda not enter the fresh oyster mushroom trade; the market is already well supplied locally and is not growing. The overall market for fresh oyster mushrooms probably does not exceed several hundred tons per year. UK production is estimated at 150 MTs, compared to 97,000 MTs of total mushroom production.

While volumes for fresh oyster mushrooms are small, they are much larger than the market for dehydrated product. One industry source considered it to not be viable, due to low demand and consumption levels in the UK, and the ample supply already available for the small demand.

Current Ugandan export volume is about 50 kilograms of dehydrated product per month; an amount which can barely be absorbed by the current market. If and until new markets can be identified for dehydrated oyster mushrooms, ADC/IDEA recommends no further expansion of production by existing Ugandan producers and no new investments by those currently not in the sector.

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Prices

Because of the small volume, fresh oyster mushroom prices are not published. As a rough guide, prices are about two to three times that of button mushrooms. One wholesaler reports in March 1998 that he is paying suppliers between £3.50 and £4.00 for 1.5 kilograms of fresh oyster mushrooms. The entry of new suppliers into this market will certainly, in this wholesaler's opinion, lead to further reduction in prices as has happened in the past. Over the last 10 years, the prices that this wholesaler have been paying have dropped around 50 percent (from levels around £8.00 per 1.5 kilograms).

Wholesaler selling prices are not stable, fluctuating greatly depending on availability. Current wholesale prices (March 1998) were reported at £5.75-£7.80 for a 3-lb carton in some areas and at £1.60-£2.00 per lb in others.

Current Ugandan dehydrated product is being sold at around US\$16/kg (ex farm Uganda).

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Competition

Eastern Europe and Asian countries supply most import demand by EU countries, excluding internal trade (see Tables 2 and 3).

The major exporters of fresh oyster mushrooms to the UK are France and Belgium since distant suppliers have difficulty in maintaining acceptable quality for this highly perishable product. Wholesalers in the UK report that

most demand for fresh oyster mushrooms is met by local production; imports are made only if there is a shortage of domestic production. Industry sources currently view the fresh oyster mushroom market as stable, niche market, but not growing.

Table 2: Largest EU Import Markets for Extra-EU Imports of Fresh Mushrooms and Sources, 1996, MTs

	Germany	Italy	Austria	France	UK	Other	Total
Total Extra-EU	11,459	6,577	6,571	2,146	134	503	27,390
Extra-EU as percent of total imports	31%	75%	81%	21%	0%	2%	19%
Percent of Extra-EU from:							
Eastern Europe	99%	100%	100%	77%	8%	75%	97%
Asia	0%	0%	0%	1%	75%	3%	1%
North America	1%	0%	0%	21%	16%	17%	2%

Source: EUROSTAT

Table 3: Largest EU Import Markets for Extra-EU Imports of Dried Mushrooms and Sources, 1996, MTs*

	Italy	France	Germany	Neth.	UK	Other	Total
Total Extra-EU	1,702	914	892	114	108	204	3,934
Extra-EU as percent of total imports	92%	81%	78%	39%	37%	10%	59%
Percent of Extra-EU from:							
Eastern Europe	63%	18%	9%	1%	0%	11%	34%
Asia	36%	76%	81%	94%	98%	80%	61%

* includes truffles

Source: EUROSTAT

Production

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Method

Uganda's current production for export is of dried oyster mushrooms. The mushrooms are produced by small outgrower production groups in Kabale in adapted rooms or traditional buildings around their homes. Mushroom growing involves growing mushroom spawn on a substrate, harvesting the mushrooms, and drying them using solar dryers.

The substrate must be sterilised by boiling in water in an oil drum or similar container. The material used is typically sorghum husks, readily available locally and at low cost. After the substrate is sterilised and cooled, it is inoculated with spawn inside black polythene bags.

The bags are hung from bars in the growing rooms for two to three weeks, during which time the mushrooms start to develop. When the young mushrooms start to push out the walls of the plastic bag, the substrate block is removed from the bag (or the bag is ripped open) and placed on a shelf to allow normal growth.

To ensure top quality product, mushrooms must be picked when they are fully mature but before they start to turn brown and before the edges start to turn black. The substrate blocks will continue to produce new mushrooms for 3 to 5 weeks if they are picked regularly. After this time, the block will not produce economical yields and it should be removed from the growing room; it can be placed in the garden as a fertilizer for other crops.

Rooms must be kept extremely clean to prevent contamination of the substrate. The developing mushrooms must be watered regularly (two times per day recommended) to ensure healthy growth. Light, temperature, and humidity must be carefully controlled to obtain good quality mushrooms. Temperature and humidity can be maintained by placing water either in trenches or in pans/trays on the floor.

For the dried export market, the mushrooms are typically dried using relatively inexpensive solar driers.

7 Varieties

Currently, oyster mushrooms are currently being produced in Uganda for the dried export market.

8 Yield

One “block” of substrate usually yields 1.5 to 2.5 kilograms of fresh mushrooms, assuming four harvests over a five week period. One kilogram of fresh mushrooms yields about 0.1 kilograms of dried product. Therefore, over a five week harvest period, dried mushroom yields per “block” of substrate should be between 0.15 and 0.25 kilograms.

9 Time to First Harvest/Seasonality

Harvesting begins about three to four weeks after substrate colonization and can continue for an additional three to five weeks before yields become uneconomical.

10 Pests and Disease Prevention

The largest concern is contamination of the product. The substrate should be sterilised by boiling before injecting the spawn. Spawn should also be pure. Growing rooms must be maintained in as sterile condition as possible.

11 Fertilizer Requirements

No fertilizer is required to produce oyster mushrooms.

12 Water Requirements

After colonization and once removed from the plastic bags, the blocks should be watered by hand twice per day.

Water should also be placed in containers or trenches in the floor to lower room temperatures and regulate room humidity.

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Product Specifications

Dried oyster mushrooms must contain no foreign debris, have no excess moisture after drying, and be unbroken. The mushrooms should be as white as possible, which means that they should be harvested before they start to turn brown or their edges turn black.

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Packaging

Production groups or single outgrowers should place product in plastic bags for transport to the local buyer. The local buyer will consolidate and repack the mushrooms into plastic bags, ranging in size from ___ kg to ___ kgs, with suitable labeling for the export market.

Investment

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Cost of Production

Estimated costs of product for an outgrower producing 200 kilograms of dried mushrooms per year is given in Table 4. Costs of production include: (1) materials to produce one block of substrate, including starting material, firewood, spawn, and plastic bags (total cost of Ushs 1,730/block) and (2) labor to produce the substrate, water the mushrooms, keep the growing room clean, harvest, and dry the mushrooms (estimated at three person days per week at Ushs 1,500/day). Other/miscellaneous costs (transportation, other materials, etc.) are estimated at five percent of gross revenue.

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Profitability

Table 4 provides a gross margin estimate (Ushs 886,000) for a small outgrower producing 200 kilograms of dried oyster mushrooms per year. In this estimate, an average of a little under 20 new substrate block are “planted” each week -- with each substrate block providing a yield of 2 kilograms of fresh mushrooms or 0.2 kilograms of dried mushrooms.

In Uganda, outgrower production is generally undertaken in production groups (typically up to 20 women). Under this scenario, significant more production would be required to make production of oyster mushrooms feasible for individual members of these groups. Larger scale production of oyster mushrooms (for example, the planting of 500 new substrate blocks per week) would potentially yield 5,200 kilograms per year of dried mushrooms or 433 kilograms per month. The current UK importer of Ugandan dried oyster mushrooms can currently sell only a fraction of this amount. Therefore, profitability assumes that there is a market to sell dried product. Overproduction of product will likely result in lower prices and the inability to sell some production. In that event, dried oyster mushroom production in Uganda would unlikely be profitable. Unless or until new markets can be identified for dried oyster mushrooms, further expansion of production in Uganda is strongly discouraged.

Table 4: Annual Gross Margin Estimates for Annual Production of 200 kgs of Dried Oyster Mushroom by an Outgrower in Kabale (Ushs)

	<u>Kilograms</u>	<u>Ushs/KG</u>	
REVENUE FROM SALES OF DRIED MUSHROOMS ¹	200	15,000	<u>3,000,000</u>
COSTS OF PRODUCTION			
Substrate Materials	<u>Blocks</u>	<u>Ushs/Block</u>	
Firewood	1,000	100	100,000
Spawn	1,000	1,500	1,500,000
Plastic Bag	1,000	100	100,000
Starting Material (sorghum husks)	1,000	30	30,000
Subtotal Substrate Materials			1,730,000
Labor Estimates ²	<u>Days</u>	<u>Ushs/Day</u>	
Labor to Produce Substrate	52	1,500	78,000
Labor for Care & Harvesting	52	1,500	78,000
Labor for Drying	52	1,500	78,000
Subtotal Labor			234,000
Other/Miscellaneous Costs (5% of gross revenue)			150,000
TOTAL COSTS OF PRODUCTION			<u>2,114,000</u>
GROSS MARGIN (Ushs/year)			<u>886,000</u>

¹ Yield of 2.0 kilograms fresh mushroom per block of substrate, dry yield is 10% of fresh yield.

² Labor estimates based on 1 day per week each for production of substrate, care/harvesting of existing crop, and drying.

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Investment Requirements

Assuming an outgrower seeks to produce 200 kilograms of dried oyster mushrooms per year, investments will be needed to be made in the following items:

- # Building for growing mushrooms (estimated cost Ushs 50,000) plus cement floor (estimated cost Ushs 100,000). A cement floor is recommended to prevent contamination of the substrate.
- # Racks inside the growing room on which to place substrate blocks (estimated cost Ushs 50,000).
- # Oven and oil drum or other container to sterilise the substrate (estimated cost Ushs 50,000). ADC/IDEA has produced an informative guide on building an efficient stove for use in mushroom production.
- # Solar dryer to dry the mushrooms (estimated cost Ushs 150,000).

Therefore, an initial investment of approximately Ushs 400,000 is required. Larger scale production, such as in production groups of 20 or more women, will require substantially higher investment costs in growing rooms and other equipment.

More Information

Additional information is available from ADC/IDEA on production of dried oyster mushrooms in Uganda as well as the export market for mushrooms in general.

ADC Commercialisation Bulletins are published by the Agribusiness Development Centre of the USAID-funded Uganda's Investment in Developing Export Agriculture (IDEA) Project. The bulletins provide potential investors with a quick reference to production and market characteristics for various high-value export crops. For additional technical details, contact:

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